Current and On-going Chemical Hazards in Our Schools

Dave Waddell
Sr. Environmental Investigator/Project Mgr
King County Hazardous Waste Mgmt Program

I support the concepts behind the school mapping project

School Mapping: Emergency Response System

In Washington, a series of steps are required to map school safety hazards. This is important information to have in case of an emergency. The school mapping system is a component of the Washington Association of Sheriffs and Police Chiefs. This system provides school safety information to law enforcement, school administrators, and others. School mapping information is available online at www.washsheriff.org. This system is available to schools in the state that have been mapped. By participating in the school mapping system, school officials can ensure that staff and students are aware of safety hazards and can be prepared for emergencies.

I don’t see a chemical hazards topic listed

What did I know about this lab in 1996?

Nothing until I walked on site
The teacher gave me a taped box and said “these are the ones for disposal”

We then started looking around

And after 12 explosives were stabilized

We disposed of over 800 containers

Here’s their current Rapid Responder inventory

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>No chemicals reported</td>
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**Chemicals - Roosevelt High School**

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For a school with six science teachers I find this very difficult to believe.

We can’t know what’s going on in science and art without visiting schools.

Every school’s inventory includes acids

Oxidizer by combustible liquid

Rusted chlorine cylinder

Rust from failing cabinet shelving

Clips rusted away, shelf supported by acid bottles

Nitric acid vapors escaping, inhalation causes pulmonary edema
Nitric acid is consistently problematic

Gallon of nitric with bad cap below seven pounds of cyanides on shelf without lip

Acid vapors corroded plates, imagine the wires inside the cupboard

Combine to create the gas chamber

Hydrofluoric Acid (HF)
Absorbs quickly through skin

- Acute systemic poison
- Bone disintegration
- Extreme pain
- Gangrene, amputation
- Half pint on skin = death
Commonly found in both science & art

Every inventory includes flammables

Often many old, unneeded, obscure, flammable and chlorinated solvents

Sometimes they’re in the wrong place
Poisonous and highly flammable

Sometimes flammable solids and liquids are stored together

Potentially explosive

250 milliliters of ethyl ether

Twenty-five foot diameter fireball

Other peroxide forming solvents
Flammable carcinogens

Inventory lists contain hydroxides

Highly corrosive to eye tissue

Inventory lists sodium, lithium, potassium
Sometimes unknowns are air-reactive

They may not mention mercury (banned in WA) so you don’t take it away

Facility design issues

- Architecture vs. safe science
No dilution ventilation in storeroom

Exhaust ducts ending indoors

Blocked safety equipment

Malfunctioning eye washes

Eyewash installed upside down

Unreachable safety showers
How old are some of these bottles?

$1,300 worth of rust in 7 years

Pre-1930
1930 to 1960

1960’s – Sputnik’s Legacy (90 percent of these)

And then there’s the art classrooms

Chemical hazards could in art
• Flammable solvents
• Acids and etchants
• Carcinogens
• Heavy metals
• Neurotoxins
• Silica dust

Flammable art solvents

Application technique affects exposure

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Spray adhesive solvents
All are flammable, toxicity varies

Higher toxicity ↑
- Toluene
- Hexane
- Cyclohexane
- Acetone
- Heptane
- Petroleum naphtha
- Methylpentane

Lower toxicity ↓

Avoid hexane + acetone combo!
- Neurotoxin if inhaled or on skin
- Destroys nerve cells in hands/feet
- Poor recovery from damaged nerves

Art acids of concern

Heavy metal dusts

The first 42 ceramics teachers we met were asked this question:
“Do you have any lead glazes?”

41 of 42 said:
“No. We eliminated them years ago.”
Checked their labels – 40 had them

I doubt the accuracy of their reporting

The way glazes are stored matters

Premixed vs. Powdered

Silica dust
Of 295 public school districts in WA

Around 86 have been cleaned out

Most high-risk chemicals can go
- Reactive, unstable, degraded compounds
- Mercury liquid and compounds
- Highly toxic solvents
- Toxic heavy metals
- Hydrofluoric acid
- Cyanides

Given funding and expertise
- Can’t trust the schools to do this on their own
- Expertise is available as may be off-set of disposal costs through county hazardous waste programs
Oregon Model

- Been cleaning out schools since 2005
- Disposal costs were absorbed by county programs in Portland, Eugene, Salem and eastern Oregon run by NAHMMMA members
- Contractor trains teachers, inspects schools, identifies chemicals to go, reorganizes storage, photo-documents and reports on chemicals and safety hazards

Two high schools a day

Four middle schools a day

Provides great training for HHW staff

Chemical safety improvement costs

Contractor cost estimate
- Around $700/high school, $300/middle school
- Disposal costs may be none or very high
- Negotiate in advance with counties
- Incentive for participation
- Reduced liability insurance rate

Once gone, they won’t be replaced
Let's prevent these future critical incidents

Thanks for your time!